# Construction Quality Assurance Plan

## for

# Lagoon Area Soils Cap

## Electro-Voice, Inc.

## Buchanan, Michigan

**Project Number F93307J**

Fishbeck, Thompson, Carr & Huber
Engineers • Scientists • Architects

# CONSTRUCTION QUALITY ASSURANCE PLAN

# LAGOON AREA SOILS CAP

# FOR

# ELECTRO-VOICE, INC.



October 1995
Project No. F93307J

Prepared by:

FISHBECK, THOMPSON, CARR & HUBER, INC.
6090 East Fulton, P.O. Box 211
Ada, Michigan 49301-0211
(616) 676-2666

7402 Westshire Drive, Suite 110
Lansing, Michigan 48917-9764
(517) 627-1141

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# 1.0 INTRODUCTION

## 1.1 Purpose and Scope

This *Construction Quality Assurance Plan* (CQA Plan) has been prepared to guide the construction of the lagoon area cap at the Electro-Voice, Inc. (EV) Site. This CQA Plan sets forth the requirements, procedures, and methodologies to ensure that the remedial activities are implemented in accordance with the *Record of Decision* (ROD) and the construction contract documents.

The major remedial activities to be conducted at the site include the following:

- Excavation of contaminated soils outside of the cap area and placement in the area to be capped.
- Construction of a cap meeting the requirements of the State of Michigan Act 64.

The remedial activities are designed to protect against direct contact exposure and protect groundwater below the site from metals present in the soil above Michigan Department of Natural Resources (MDNR) Default background concentrations.

## 1.2 Background

Data obtained under this CQA Plan is used to ensure that the work is conducted in accordance with the design drawings and specifications. The data is related to the materials, equipment, and techniques used to construct and install the remedial systems. This information and data is typical of which would be collected for any construction project, whether related to a hazardous waste site or not.

The construction drawings and specifications will guide the quality assurance/quality control activities required by the construction contract. Specific test procedures used include ASTM methodologies, and are typically carried out by a materials testing firm or the contractor, and observed by onsite personnel.

## 2.0 RESPONSIBILITY AND AUTHORITY

### 2.1 Organizations

The remediation project is being carried out under the authority of the U.S. Environmental Protection Agency, Region V (EPA). The MDNR is involved with EPA in reviewing the project.

EV is responsible for implementing the remedial action. The engineering consultant for the project is Fishbeck, Thompson, Carr & Huber (FTC&H). FTC&H is responsible for the design of the facilities and for construction phase engineering services. FTC&H will also serve as Project Coordinator for the remedial action. The FTC&H Project Coordinator works with the EV contact person to manage the overall project. The FTC&H Project Coordinator will serve as the point-of-contact for all communication among the organizations involved in the project.

The following contractor services are anticipated for this project:

- Construction contractor for excavation, grading, and cap construction.
- Geotechnical testing service.

### 2.2 Key Personnel

The key personnel for this project are as follows:

EV contact: Mr. Ronald M. Graham

Mr. Graham is the point-of-contact for EV and has overall site responsibility.

EPA Remedial Project Manager - Ms. Eugenia Chow, P.E.

Ms. Chow manages the project for EPA.

Project Manager/Coordinator - Mr. James A. Susan, P.E.:

Mr. Susan of FTC&H will manage all aspects of the project to ensure that the project is conducted in accordance with the ROD, contract documents, and this CQA Plan.

Construction Quality Assurance Officer - Mr. David L. Conklin, P.E.:

The FTC&H CQA Officer oversees the implementation of the CQA Plan. The CQA Officer has full responsibility to require any corrective actions necessary to ensure that the facility is constructed in accordance with the drawings, specifications, and the CQA Plan. The CQA Officer reports to the Project Manager on a weekly basis, or as needed.

Resident Project Representative (RPR): To be determined

The RPR, an FTC&H employee, will be responsible for the day-to-day activities at the site during construction. The RPR reports to the CQA Officer. The RPR will communicate with the CQA Officer at least weekly.

Site Health & Safety Officer: To be determined

The FTC&H Site Health & Safety Officer will be responsible for the enforcement of all aspects of the FTC&H *Health and Safety Plan* (HASP). This responsibility and authority will cover only FTC&H employees, and does not include contractor, governmental agency, and other personnel. The Site Health and Safety Officer reports to the Project Manager and Corporate Health and Safety Officer. The Site Health and Safety Officer communicates with all FTC&H employees at the site, whenever necessary, to discuss health and safety issues.

Corporate Health and Safety Officer - Mr. A. Joseph Aitchison, SPHR:

Mr. Aitchison is responsible for all FTC&H health and safety issues at the corporate level.

The project organization is illustrated on Figure 1.

## 2.3 Meetings

Throughout the project, periodic meetings will be held to discuss various aspects of the project. The meetings will encourage communication among the personnel responsible for designing, monitoring, and constructing the facilities. The following meetings will be held:

- Preconstruction CQA Meeting
- Monthly Progress Meetings
- Problem or Work Deficiency Meetings

The preconstruction CQA meeting will be scheduled and conducted by FTC&H. FTC&H will be responsible for preparing the agenda and the meeting minutes.

The monthly progress meetings will be organized by the contractor. The minimum agenda is presented in the Project Manual and the meeting minutes will be prepared by FTC&H.

The problem or work deficiency meetings will be held when significant or recurring problems occur. These meetings will not be held at regular intervals unless circumstances warrant regular meetings. The work deficiency meetings may be called by anyone associated with the construction activities. The meeting minutes will be prepared by FTC&H.

## 3.0 PERSONNEL QUALIFICATIONS

### 3.1 Experience

Each person involved with the work at the site will be experienced in performing the duties and tasks assigned. The CQA Officer will be responsible for ensuring the qualifications and training of individuals on the site. The CQA Officer for this project is Mr. David L. Conklin, P.E. Mr. Conklin is a registered engineer, and has experience with hazardous waste projects and construction projects. The resumes of Mr. Conklin and other key personnel are presented in Appendix 1.

### 3.2 Training

All personnel working within contaminated areas of the site or working with contaminated materials will be health and safety trained in accordance with the relevant subsections of 40 CFR 1910.120. Training requirements include either the 40-hour or 24-hour basic health and safety course, and annual 8-hour refresher course work. FTC&H employees working within or adjacent to an exclusion zone are required to have 40-hour health and safety training. FTC&H employees who only visit the site occasionally are required to have 24-hour health and safety training.

All personnel working within contaminated areas of the site will be required to be under their company's HASP and medical monitoring program. The medical monitoring program requirements will be as set forth in 40 CFR 1910.120.

The RPR will have completed appropriate training programs and/or have the experience necessary to effectively carry out the RPR duties. This training/experience may include:

- Minimum of a high school diploma.
- Post-high school courses.
- Training/certification in applicable materials testing procedures such as soil density meter, moisture testing, etc.
- Previous experience at similar construction projects.

# 4.0 MONITORING REQUIREMENTS

## 4.1 Monitoring Activities

### 4.1.1 General

Observation and monitoring activities will be conducted throughout the construction period. The observation/monitoring program is designed to ensure the following:

- Only specified materials are used in the construction.
- Specified quality standards are met throughout construction.
- The cap is constructed in accordance with the drawings and specifications.
- The activities comply with appropriate environmental requirements such as erosion control, air/water discharges, etc.
- Appropriate health and safety procedures and equipment related to work at hazardous waste sites are in-place at the construction site. Construction-related safety is the responsibility of the contractor.
- The systems perform as designed.

Overall monitoring and observation during construction will be the responsibility of the RPR. The RPR will observe and monitor all aspects of the construction project for general conformance with the construction documents.

Specific performance requirements for the construction activities are described in the construction project manual. The project manual details the type of tests required, the testing methodology to be followed, the frequency of the testing, and the acceptable limits of the test results. FTC&H will be responsible for the field monitoring and laboratory testing.

4.1.2 Pre-Final and Final Inspections

Upon completion of the remedial action, a Pre-Final Inspection will be conducted with the contractor and personnel from EV, EPA, MDNR, and FTC&H. The Pre-Final Inspection will identify any deficiencies and corrective actions.

A Final Inspection will be conducted after the deficiencies identified during the Pre-Final Inspection have been corrected. The Final Inspection will confirm that the deficiencies have been addressed in a satisfactory manner.

A Pre-Final Inspection Report and a Final Inspection Report will be prepared by FTC&H and submitted to the EPA (Section 6.0).

## 4.2 Monitoring and Onsite Testing Requirements

The monitoring methods and onsite testing/monitoring requirements are summarized in Table 1.

TABLE 1
Monitoring Methods and Onsite Testing/Monitoring Requirements

| Component | Factors Monitored | Methods | Test Method Referenced* |
|---|---|---|---|
| Clay-Borrow Pit (by Contractor) | Soil Type (index properties) | Visual-manual procedure<br>Particle size analysis<br>Atterberg limits<br>Soil classification | ASTM D2488<br>ASTM D422<br>ASTM D4318<br>ASTM D2487 |
| | Moisture-density relations | Modified Proctor | ASTM D1557 |
| | Permeability (laboratory) | Flexible wall | ASTM D5084 |
| Clay - Placed | Soil Type (index properties) | Visual-manual procedure<br>Particle size analysis<br>Atterberg limits<br>Soil classification | ASTM D2488<br>ASTM D422<br>ASTM D4318<br>ASTM D2487 |
| | Coverage | Observation | NA |
| | Thickness | Surveying; measurement | NA |
| | Clod Size | Observation | NA |
| | Tying Together of Lifts | Observation | NA |
| | Slope | Surveying | NA |

| TABLE 1 (continued) | | | |
|---|---|---|---|
| Component | Factors Monitored | Methods | Test Method Referenced* |
| Clay - Placed | In-place density | Nuclear method | ASTM D2922 |
| | Moisture-density relations | Modified Proctor | ASTM D1557 |
| | Permeability (laboratory) | Flexible wall | ASTM D5084 |
| Subgrade | In-place density | Nuclear method | ASTM D2922 |
| | Moisture-density relations | Modified Proctor | ASTM D1557 |
| Granular drainage layer | Permeability (laboratory) | Flexible wall | ASTM D5084 |
| | Thickness | Surveying; measurement | NA |
| | Coverage | Observation | NA |
| | Soil type | Supplier certification, particle size analysis | ASTM D422 |
| Pipes | Material type | Manufacturer's certification | NA |
| | Handling and storage | Observation | NA |
| | Location | Surveying | NA |
| | Jointing | Observation | NA |
| | Slope | Surveying | NA |
| Topsoil and vegetation (erosion control measures) | Thickness | Surveying | NA |
| | Slope | Surveying | NA |
| | Coverage | Observations | NA |
| | Vegetation type | Supplier's certification; observation | NA |
| | Seeding time | Supplier's recommendations; observations | NA |
| * For all test methods, the latest revision will be used. | | | |

4.2.1 Subgrade Preparation

Subgrade preparation for the cap area includes the following:

- Clearing and grubbing
- Placement of excavated contaminated soil to design elevations and grades

*Construction*

Observations will be made to determine that all trees, shrubs, stumps, and roots have been removed from the subgrade area.

Excavated soil will be placed in 12-inch lifts and compacted to 90% of the maximum density.

Periodic measurements will be made to determine the lift thicknesses. Density and moisture testing will be conducted at a frequency of one test per 5,000 cubic yards (cy) or as the soil texture changes. Measurements will be made periodically to determine that the appropriate slopes and grades are being maintained.

Post Construction

Once all the excavated soils have been placed, final measurements will be made to confine grades and slopes. Any areas requiring regrading will be identified and regraded before capping begins.

4.2.2 Clay

Activities related to the clay include the following:

- Placement of the clay
- Compaction of the clay

The contractor will be responsible for obtaining a suitable source of clay. The contractor will provide data from the clay source that sufficient quantities of the specified clay exists. FTC&H staff will visit the proposed source to review the available data and observe operations at the borrow pit.

Preconstruction

Preconstruction activities consist mainly of observations to ensure that the clay is uniform and as specified. *Observation will be made as the clay is brought onsite and at the borrow area.* Onsite, the clay will be observed for changes in color or texture, and for the presence of roots, stumps, or large rocks. At the

borrow pit, the source of the clay will be observed to ensure that only material specified is provided. Borrow site visits will be made weekly.

Construction

The clay cap will be constructed in 9-inch lifts. The Resident Project Representative (RPR) will observe the placement of the clay daily. In-place testing will be conducted at a minimum rate of one test per day per lift to determine moisture content and density. Permeability and soil classification test samples will also be collected at a frequency of one test per 10,000 cy of placed clay or after observing a change in texture or other characteristics of the clay.

Observations will be made throughout the clay cap construction to identify the following:

- The clay is free of roots, rocks, rubbish, or off-spec material.
- Changes in soil characteristics necessitating a change in construction.
- Adequate spreading of clay to obtain complete coverage and the specified loose lift thickness.
- Adequate clod size reduction of the material.
- Adequate spreading and incorporation of water to obtain full penetration through clods and uniform distribution of the specified water content.
- If a significant prolonged rain or drought during construction requires adjustment of the moisture content.
- Significant water loss and desiccation cracking before and after compaction.
- Type of compaction equipment.
- Uniformity of coverage by compaction equipment, especially at compacted fill edges, in equipment turnaround areas, and at the tops and bottoms of slopes.

- Consistent achievement of the specified soil density, water content, and permeability throughout each completed lift.

- Repair of penetrations or holes resulting from the collection of undisturbed soil samples or the use of density or moisture probes using the same materials and methods used for repairs on the test fill.

- Use of methods sufficient to tie liner lifts together.

- Timely placement of protective covers to prevent desiccation of clay between the installation of lifts or after completion of the clay cap.

- Prevention of accidental damage of installed portions of the soil liner by equipment traffic.

4.2.3 Drainage Layer

Activities related to the placement of the drainage layer include the following:

- Placement of the sand
- Grading

Preconstruction

Since the drainage layer is placed above the clay, most of the preconstruction activity relates to confirming that the clay has been properly placed, graded, and compacted.

Testing results must be obtained from the contractor to confirm that the sand conforms to Michigan Department of Transportation Type II material requirements. FTC&H will collect one sample for grain size analysis to ensure conformity and collect samples for permeability testing.

Construction

The drainage layer will be constructed in 12-inch lifts. The RPR will observe the construction daily for the following:

- The material is as specified and is free from rocks, wood, and other debris.
- Measurement of the lift thickness and observe coverage.

### 4.2.4 Topsoil

A 4-inch topsoil layer will be placed above the drainage layer to protect the underlying cap layers from erosion by providing a soil for vegetation to grow. Alternatively, wastewater treatment plant sludge may be mixed with 4 inches of sand to create a suitable soil to establish the vegetation.

#### Preconstruction

Preconstruction inspection activities will include checking topsoil properties against the design specifications and ensuring that deleterious materials are not included.

#### Construction

During construction of the topsoil layer, the RPR will monitor the uniformity of the application process, observe the placement procedure to ensure that the soil is not overly compacted, and measure the thickness and slope of the topsoil layer.

### 4.2.5 Seeding

Topsoil placement, preparation for seeding, and the seeding may take place in a continuous operation. Observations before seeding will include confirmation that the soil additive and seed are as specified in the design. Tilling depth should be measured, and the application rate of additives should be monitored to confirm that it is as specified in the design. The slope of the final surface of the cover should also be verified to ensure that it meets the design requirement.

Hydromulching will be used to establish the vegetation in the cap. The rate of seed and mulch application, amount and uniformity of coverage, and watering will be observed. Perimeter areas will be examined to ensure that bare spots are not left inadvertently.

The RPR will make a visual check of the completed cover to ensure that it meets the specified design. Slopes will be surveyed, any unusual depressions should be noted and corrected. The perimeter configuration, including drainage conduits also should be examined for conformance to design specifications.

Observation of the cover will continue until it is ascertained that a vegetative cover has been reasonably well established. The vegetation will be evaluated during the first 60 days following seeding. If during this period bare areas are present, the contractor is responsible for reseeding or other corrective action that may be required to re-establish the vegetation.

## 4.3 Surveying

Surveying will be performed at the construction site for the following:

- Identify the horizontal and vertical limits of the contaminated soil excavation.
- Determine and verify the extent of the cap and slopes on the subgrade, clay, drainage layer, and topsoil.
- Verify the thickness of the clay, drainage layer, and topsoil.
- Establish the location and slopes of access roads, drainage swales, and pipes.

Horizontal and vertical measurements will be made to within $\pm 0.1$ feet of proposed grades or boundaries indicated on the drawings.

### 4.3.1 Contaminated Soil Excavation

The horizontal limits for each excavation depth will be determined and staked to establish the minimum required excavation. The excavation contractor may elect to over-excavate to stabilize the slopes or to provide access for equipment. The horizontal limits will be established based on the existing 44-foot grid.

As the excavation proceeds, the vertical and horizontal dimensions will be determined by survey to verify that the required limits have been met.

The final fill elevations and slopes in the excavation area will be determined and verified by survey.

### 4.3.2 Cap Extent and Slopes

The extent of the clay cap will be identified and grade stakes placed to establish slopes for the subgrade. Before any clay is placed in an area, the final subgrade surface will be surveyed to verify that the proper slope had been established.

As the clay, sand, and topsoil are placed, the slopes will be verified by survey. The survey will also determine that the clay had been placed to the appropriate horizontal limits.

### 4.3.3 Cap Layer Thickness

The thickness of each cap layer (clay, sand, and topsoil) will be verified by survey before the next layer is placed. Thickness will be verified at each node of the existing 44-foot grid. The grid will be extended to cover all areas of the cap, where necessary.

### 4.3.4 Access Roads, Drainage, and Fencing

Surveying will be used to establish the location and grade of the perimeter access road, and the surface drainage swales and pipes. The location of the fence will also be established by survey.

## 5.0 SAMPLING AND ANALYSIS REQUIREMENTS

Materials and placement sampling will be required throughout the construction project to ensure compliance with the contract documents and project drawings. Additionally, construction permits, such as for erosion control, may include sampling requirements. Any sampling requirements included in the construction permits will be identified and implemented once the permit has been obtained. All sampling requirements required by permits will be communicated to the EPA.

Sampling will be required for the following purposes:

- Materials quality/acceptance
- Acceptance testing

Media/materials to be sampled during construction/installation activities will include the following:

- Select fill for the drainage layer
- Clay for the impermeable layer

Detailed descriptions of the sampling locations, frequency, methodologies, testing methods, acceptance/rejection criteria, and acceptable limits of test results are referenced in the construction documents. A summary of the sampling requirements is presented in Table 2.

TABLE 2
Sampling Requirements

| Component | Analysis | Frequency | Estimated Number of Samples |
|---|---|---|---|
| Clay (soil type) (by Contractor) | Visual | Preconstruction | 2 |
| | Particle size | Preconstruction | 2 |
| | Atterberg limits | Preconstruction | 2 |
| | Soil classification | Preconstruction | 2 |
| | Moisture-density | Preconstruction | 2 |
| | Permeability | Preconstruction | 2 |
| Clay (in place) | Visual | Every 10,000 cy | 1 |
| | Particle size | Every 10,000 cy | 1 |
| | Atterberg limits | Every 10,000 cy | 1 |
| | Soil classification | Every 10,000 cy | 1 |
| | Moisture-density | Every 10,000 cy | 1 |
| | Permeability | Every 10,000 cy | 1 |
| | Density | Daily | 30 |
| Subgrade (excavated soil) | Density | Every 5,000 cy | 4 |
| | Moisture-density | Every 25,000 cy | 1 |
| Drainage Layer | Permeability | Every 5,000 cy | 2 |
| | Particle size | Every 5,000 cy | 2 |
| | Soil classification | Every 5,000 cy | 2 |

Corrective action will be required whenever an analytical or test result falls outside of the acceptable limits or established criteria. Corrective action may require modifications in methodology or technique, removal and replacement of deficient materials, or changes to the design. Once the need for a corrective action has been established, no further related work will be performed until the deficiency is corrected.

The cause of the deficiency and the required solutions/modifications to correct the deficiency will be documented to prevent reoccurrences. Pertinent information related to the corrective action will be documented on the Construction Progress Report Form (Appendix 2).

The need for corrective action will be determined by the CQA Officer and/or the RPR. Minor corrective actions, i.e., recompaction of small areas, etc., will be authorized by the RPR, documented on the daily report, and summarized in the monthly report to the EPA. Significant corrective actions that require major rework or procedural modifications will be recommended by the CQA Officer and approved by the Project Manger. Significant actions are those resulting from a problem or work deficiency meeting or undertaken as a results of a Field Order, Work Change Directive, or Change Order. The Project Manager will discuss significant corrective actions with the EPA prior to implementation. The CQA Officer or Project Manager will prepare the Corrective Action Report (Appendix 2). The Corrective Action Report will be sent to the EPA.

## 6.0 DOCUMENTATION

### 6.1 Reporting Requirements

All activities at the site will be documented on the Construction Progress Report Form (Appendix 2) and in periodic reports. Documentation requirements include: materials tests and test results; monitoring activities and observations; problems encountered and solutions; health and safety activities; and acceptance testing.

### 6.2 Daily Records

All onsite inspection personnel will maintain daily records which will detail their activities. The records may include monitoring forms, logbook entries, or testing forms. The RPR will prepare daily reports summarizing all activities for the day. The daily summary report will include the following information:

- Contractors hours at the site
- Weather conditions
- Data related to change orders, work directive changes, or changed conditions
- Site visitors
- Daily activities
- Problems encountered and solutions
- Decisions made
- General and specific observations
- Sampling performed
- Health and safety information

All observations, and field and/or laboratory tests will be recorded on the inspection/test data sheets. The data sheets will include notes, sketches, and charts. Inspection/test data sheets will include the date and time of the activity, description, the type of activity/test performed, the location, and the test/inspection results.

Problems encountered during construction and the solutions to the problems will be documented in a Corrective Action Report. The Corrective Action Report will be completed as soon as possible after the

problem has been identified and any necessary immediate actions have been taken. The Corrective Action Report should provide a description of the problem, the cause of the problem, the actions taken to correct the problem, and necessary actions to prevent a reoccurrence of the problem.

### 6.3 Progress Reports

Progress reports will be prepared and submitted to the EPA and MDNR monthly. The progress reports will, in general, contain the following information:

- A summary of the work accomplished during the reporting period, based on the daily inspection reports.

- A summary of the results of sampling and tests related to the work conducted at the site.

- Sections detailing anticipated problems, recommended solutions, problems encountered/resolved, submittals made, upcoming events/activities planned, key personnel changes, and the schedule.

### 6.4 Construction Completion Report

At the completion of construction, a construction completion report will be submitted to the EPA. The report will document that the remedial action has been implemented in accordance with the drawings and the Project Manual. The report will include the following:

- A synopsis of the remedial action and certification that work has been completed consistent with the *Consent Decree*.

- A description and rationale for any modifications to the original design.

### 6.5 Pre-final and Final Inspection Reports

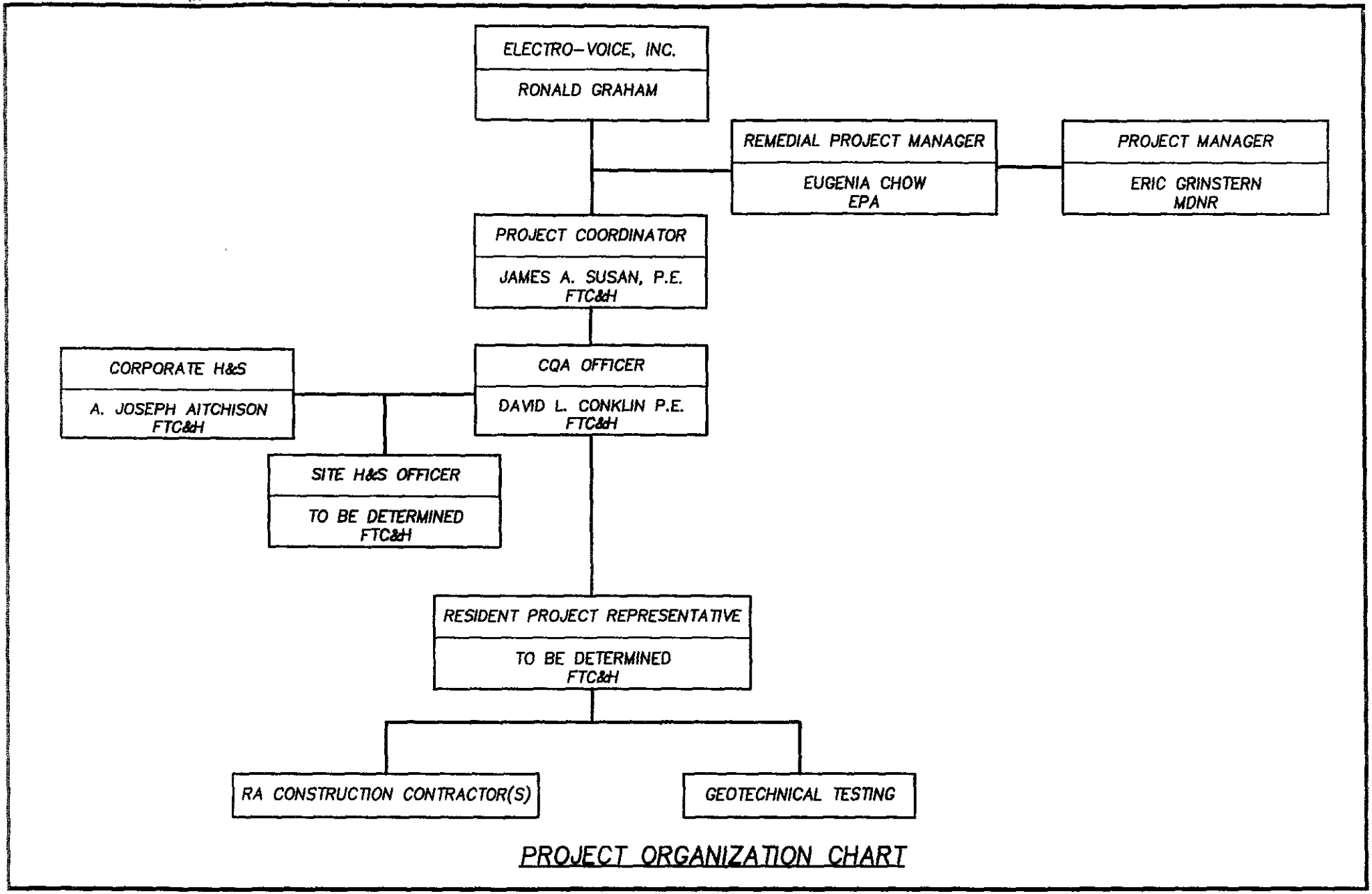
A report will be completed after the pre-final and final inspections. These reports will identify observed deficiencies, the required corrective actions, and document that the corrective actions have been completed and the deficiency corrected.

## 6.6 Draft Final Remedial Action Reports

A Draft and Final Remedial Action Report will be prepared at the completion of the project. The Remedial Action Report will include a synopsis of the work and certification of the design and construction; an explanation of any modifications made; identification of cleanup and performance standards and an explanation of any modifications made; and a review of operation and maintenance to be undertaken at the site. In addition, all of the daily reports, inspection test reports, corrective action reports, acceptance reports, and other documents that may be generated during construction and will be included or referenced. The acceptance reports will be generated periodically and will consist of daily inspection reports, test reports, and corrective action reports.

At the completion of the project, all documents and records generated during construction will be assembled for storage. All material will be reviewed, and duplicate and/or unnecessary information discarded. An index of the material will then be prepared and the documents boxed for storage. Each box will be labeled and referenced to the index.

The project documents will be maintained by EV. The documents will be stored at the EV offices in Buchanan, Michigan.




PROJECT ORGANIZATION CHART

FIGURE NO. 1

PROJECT NO. 93307J

ELECTRO–VOICE, INC.
BUCHANAN, MICHIGAN

CONSTRUCTION QUALITY ASSURANCE PLAN

ftc&h

fishbeck, thompson, carr & huber
engineers • scientists • architects
Ada • Lansing
Michigan

# David P. Bratt, P.E.

**Senior Associate**

## Registration/Certification

Professional Engineer - Michigan

## Education

M.S. Degree in Civil Engineering, Michigan State University
M.S. Degree in Crop and Soil Science, Michigan State University
B.S. Degree in Civil Engineering, Michigan State University
B.S. Degree in Chemistry/Biology, Calvin College

## Professional Experience

In general, Mr. Bratt's experience is in the area of the planning, design, and construction of municipal and industrial environmental treatment plant projects. He is responsible for water supply studies and all environmental design projects within the firm. Mr. Bratt has designed rapid-mix, flocculation, filtration, instrumentation and control systems, and finished water pumping, storage, and transmission facilities. Mr. Bratt also has extensive experience in the research, design, and construction of land application systems.

In addition, he has also been involved with the evaluation, design, and construction of treatment systems for groundwater contamination cleanup including air stripping and carbon adsorption systems for volatile organic compound removal.

## Pertinent Experience

Mr. Bratt has led the design of several groundwater remediation systems. Projects include:

- Air stripping and carbon adsorption unit for McGraw Edison
- Air stripping unit for the City of Kalamazoo, Michigan
- Air stripping unit for Westgate Oil Company
- Air stripping unit for Clark Equipment Company
- Two air stripping units for Wurtsmith Air Force Base
- Vacuum extraction soil treatment system for Smiths Industries
- Three carbon adsorption units for Westgate Oil Company
- Carbon adsorption system for Smiths Industries

## Affiliations

American Water Works Association
Water Environment Federation

# James A. Susan, P.E.

**Senior Engineer**

## Registration/Certification

Professional Engineer - Michigan, Illinois, Indiana, Ohio, Pennsylvania, Maryland, South Carolina, New Jersey
Diplomate (Hazardous Waste), American Academy of Environmental Engineers
29 CFR 1910.120 40-hour Hazardous Waste Training

## Education

M.S. Degree in Sanitary Engineering, Michigan State University
B.S. Degree in Civil Engineering, Michigan State University
Value Engineering Training Course
Supervisors Training for Hazardous Waste Site Work

## Professional Experience

Mr. Susan has a wide range of experience on a variety of different types of engineering projects related to water and wastewater facilities, hazardous waste site investigations, and underground storage tank investigations.

In the area of design, he has experience with the planning and design for new and upgraded water and wastewater facilities including treatment processes and sludge handling facilities, pump stations, and pipelines. He has also prepared operation and maintenance manuals and facility plans, conducted pilot and laboratory studies, performed hydraulic analyses, and participated in value engineering studies.

Mr. Susan managed many private, state, and federal site investigation and feasibility projects. His responsibilities have included the preparation of project plans, remedial investigation reports, feasibility study reports, remedial design, and conducting field work, preliminary assessments, site investigations, UST investigations, and property assessments.

## Pertinent Experience

Mr. Susan has the following investigation/feasibility/remediation experience:

- Responsible for the preparation of the remedial investigation report for the Theresa Street Area site, a Michigan Act 307 site located in Muskegon, Michigan.
- Responsible for the preparation of the remedial investigation report for the Keystone Sanitation Company Landfill site in Littlestown, Pennsylvania.
- Prepared the remedial investigation report for the Geiger (C&M Oil) site in Charleston, South Carolina. Work included descriptions of all field activities, evaluation of analytical results, and determination of the extent of contamination.

- Responsible for the preparation of the remedial investigation report for the First and Second Operable Units at the Independent Nail Company site in Beaufort, South Carolina.
- Prepared the feasibility study report for the Geiger (C&M Oil) site in Charleston, South Carolina. Alternatives evaluated for this waste oil contaminated site included incineration and land disposal. Incineration was eventually selected for implementation.
- Responsible for the preparation of the feasibility study report for the Independent Nail Company site in Beaufort, South Carolina. The feasibility study report evaluated stabilization, capping, and landfilling. Solidification was selected and implemented at this site. During remediation, Mr. Susan provided technical guidance to the EPA and prepared solidification guidance documents for use by EPA.
- Responsible for the preparation of the feasibility study report for the Keystone Sanitation Company Landfill site in Littlestown, Pennsylvania. The feasibility study for this 30-acre landfill included remedial alternatives for both soil and groundwater contaminated with volatile organic compounds and metals. The feasibility study recommended that a cap be placed on the landfill and that groundwater be extracted and treated. The proposed treatment a system consisted of flocculation/ sedimentation, air stripping, ion-exchange, and filtration.
- Prepared preliminary and final design for a secure sanitary landfill for dewatered WWTP sludge in Broward County, Florida. The landfill was located over a sole source aquifer. The design included leachate collection, a leachate pumping station, a HDPE liner, and closure plans. The completed landfill was to be used as a park.
- Responsible for overall management and technical review of remedial investigation and feasibility study reports for hazardous waste sites in Ohio, New Jersey, Wisconsin, and Kentucky.
- Member of technical review committees for feasibility study reports for hazardous waste sites located in Ohio, Kentucky, North Carolina, Wisconsin, and New Jersey.
- Prepared preliminary construction-related project plans to remediate groundwater and soil at the Kysor Industries CERCLA site in Cadillac, Michigan.

**Affiliations**

Air and Waste Management Association
American Academy of Environmental Engineers
American Society of Civil Engineers
American Water Works Association
Hazardous Material Control Research Institute
Water Environment Federation

# David L. Conklin, P.E.

***Environmental Engineer***

## Registration/Certification

Professional Engineer - Michigan
24-hour Hazardous Waste Operations and Emergency Response Training Course

## Education

B.S. Degree in Civil Engineering, Michigan State University

## Professional Experience

Mr. Conklin's experience has included involvement in the design of water and wastewater treatment facilities and water distribution systems. Specific wastewater treatment experience includes lagoon design and land application systems. He has also been involved with construction phase engineering and contract administration for various environmental projects.

Mr. Conklin's experience has also included solid waste landfill design, landfill closure plans, construction quality assurance plans, transfer station siting, design and permitting, and surface impoundment design.

Further experience includes the planning and design of remediation systems including air stripping, carbon, and bioremediation systems.

## Pertinent Experience

- Standish Oil Company, Houghton Lake
  Planning and design of groundwater purge and treat system and soil vacuum extraction (SVE) and air sparging system for gasoline contaminated groundwater. Prepared a complete Remedial Action Plan for submittal to regulatory agencies.
- Wurtsmith AFB
  Involved in preparation of construction drawings and specifications for purge and treat system for benzene contaminated groundwater. The treatment system included two air stripping towers for groundwater and catalytic oxidation for the resultant air stream.
- Cadillac LDFA Northernaire/Kysor Site
  Involved in preparation of construction drawings and specifications for a groundwater extraction and treatment system. The project included seventeen wells, extensive force main, two air stripping towers, and a carbon adsorption system. The project is a remedial action undertaken in accordance with CERCLA.

Mr. Conklin has performed design work for the following Type II Sanitary Landfills:

- Central Sanitary Landfill, Pierson - 3-acre cell
- Holland Board of Public Works, Holland - 20-acre dedicated landfill for flyash and municipal sludge.
- Pine Valley Landfill, Robinson Township, Ottawa County - Redesign of 12-acre cell.
- Glen's Landfill, Traverse City - 126-acre landfill development.

Mr. Conklin was responsible for construction quality assurance plans, daily monitoring and quality control for the following Type II Landfill Construction Certifications:

- Central Sanitary Landfill
- Pine Valley Landfill
- Glen's Sanitary Landfill, Maple City

Mr. Conklin prepared Landfill Closure Plans and performed Construction Certification for the following landfills:

- PCA Landfill, Filer City
- Exit 41 Landfill, Saugatuck
- Sanico North Landfill, Spring Lake
- Barney's Landfill, Vestaburg
- City of Greenville Landfill, Greenville
- Southwest Ottawa Landfill, Holland
- Glen's Sanitary Landfill, Traverse City

Mr. Conklin has performed the following Landfill Feasibility Studies:

- CMS/TES Landfill Feasibility Study
- Wolverine World Wide Landfill Feasibility Study

**Affiliations**

American Society of Civil Engineers (past president of Western Michigan Branch)
American Water Works Association

# A. Joseph Aitchison, SPHR

**Associate**
**Human Resources Director**

## Registration/Certification

Senior Human Resource Management Professional

## Education

Graduate Classes, Industrial/Organizational Psychology, Western Michigan
B.S. in Business Administration, Aquinas College
A.S. in Business Management, Davenport College of Business

## Professional Experience

As Human Resources Director at FTC&H, Mr. Aitchison is responsible for personnel and policies administration. He recruits and performs interviews with prospective candidates. He manages performance and wage review systems, makes wage adjustment recommendations, and reviews fringe benefit programs. Responsibilities also include maintaining employee and orientation handbooks, and selecting personnel group leaders. Mr. Aitchison is responsible for staff training and development, and human resources strategic planning.

As Affirmative Action Officer, Mr. Aitchison is responsible for Affirmative Action policy making and reporting, and EEO compliance.

Mr. Aitchison is also Health and Safety Officer for FTC&H. In this capacity, he ensures that all field personnel have achieved necessary health and safety training. In addition, he supervises medical monitoring and serves as the health and safety committee chair.

Additionally, Mr. Aitchison is responsible for all facilities located in Ada and for the management and/or coordination of facility projects. He participates as a member of our corporate management team; he has functioned as interim manager, establishing policies, procedures, and guidelines for computer operations, our office services group, and our information resources library.

## Affiliations

Ada Business Association/Past President and Current Advisor
Ada Council for the Arts/Board Member
American Red Cross CPR and First Aid Instructor
Employers Association, Human Resource Group
Grand Rapids Minorities in Engineering Consortium/Board Chair
Lowell Municipal Airport Board Member
Lowell Rotary Club
Michigan Chapter Consulting Engineer Council
Society for Human Resource Management
Western Michigan Consulting Engineers Council
Human Resource Committee/Board Chair

## Construction Progress Report

- ☐ Resident Project Representative (daily)
- ☐ Project Representative
- ☐ Office Staff

Report of job progress and activities. For in-house use only.

Project Name _____

Contractor _____

**Routing:**

| | | | | | | |
|---|---|---|---|---|---|---|
| Weather | | Project No. | | Project Mgr | | |
| Temperature | | Date | | Project Eng | | |
| Time onsite | | Observor | | File | | |

| | Supervisors | Carpenters | Laborers | Other | Total |
|---|---|---|---|---|---|
| Contractor's Labor Force | | | | | |

### Subcontractors

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

WORK BEING PERFORMED and MAJOR DELIVERIES _____

{use other side for additional information} _____

DISCUSSIONS or DECISIONS _____

VISITORS _____

Fishbeck, Thompson, Carr & Huber, Inc.
6090 East Fulton • P.O. Box 211 • Ada, Michigan 49301 • (616) 676-2666
7402 Westshire Drive • Suite 110 • Lansing, Michigan 48917 • (517) 627-1141

CORRECTIVE ACTION REPORT

Report No.: _____

Date of report: _____ Date of problem identification: _____

Problem location: _____

_____

_____

_____

Description of the problem: _____

_____

_____

_____

_____

Probable cause: _____

_____

_____

_____

How identified: _____

_____

_____

Suggested corrective action: _____

_____

_____

_____

Documentation of corrective action (reference inspection report): _____

_____

Actions to prevent similar problems: _____

_____

_____

_____

Signatures and date:

*Inspector:* _____ CQA *Officer:* _____

frC&h